

## **WISCONSIN EPI EXPRESS**

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[Wisconsin Department of Health & Family Services](#)

Division of Public Health  
Bureau of Communicable Diseases

"Surveillance provides information for action." [World Health Organization](#)

*The WISCONSIN EPI EXPRESS provides a regular update on communicable disease issues of importance in our state and is intended primarily for participants in the public health surveillance system. Please let us know if the topics covered are on target or if there are others that we should be addressing. Thank you. Herb Bostrom: [bostrhh@dhfs.state.wi.us](mailto:bostrhh@dhfs.state.wi.us)*

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### **1. Wisconsin State Laboratory of Hygiene Celebrates 100<sup>th</sup> Anniversary**

The Division of Public Health joins with the rest of the Public Health Community in recognizing the Wisconsin State Laboratory of Hygiene (WSLH) on its 100<sup>th</sup> anniversary (1903-2003) as a state agency. Since 1903, the WSLH has been a cornerstone of the public health system in Wisconsin, and continues today as a public health resource that is probably unmatched in any other state in the nation. The 100 year partnership between the Division of Public Health and WSLH (back then the State Board of Health and State Hygienic Laboratory) is probably the longest in Wisconsin state government, and almost certainly among the longest interagency partnerships in state government anywhere in the US.

Some highlights from the past 100 years include:

1902 -- Wisconsin State Board of Health recommends the establishment of a bacteriological and chemical laboratory for its own use and the use of state physicians.

1903 -- Wisconsin State Hygienic Laboratory opens its doors on October 1 in Agriculture Hall with Dr. H.L. Russell serving as director. During its first year, the modest one-room basement lab tested just over 100 specimens.

1907 -- Hygienic Laboratory moves to the fourth floor of South Hall on UW's Bascom Hill.

1908 -- Dr. Mazyeh P. Ravenel becomes Lab director.

1909 -- Wisconsin Rabies outbreak increases the Lab's workload.

1911- -- State Statutes change the laboratory's name to the Wisconsin State Laboratory of Hygiene.

1915 -- Dr. William D. Stovall becomes director.

1916 -- First of nine WSLH branch laboratories opens in Rhineland.

1928 -- WSLH moves to Service Memorial Institute, part of Wisconsin General Hospital.

1928 -- State Lab links "lingering fever" to the consumption of milk from Brucellosis-infected cows, push for milk pasteurization begins.

1930 -- Lab begins offering microscopic examination of tissues for malignant growth.

1937 -- Occupational Health program founded.

1946 -- WSLH medical technologist sent to New York to learn the Pap test from Dr. Papanicolaou.

1951 -- Construction of Henry Mall facility begins.

1953 -- Henry Mall building completed on February 28, branch labs close upon opening of new facility.

1957 -- The School of Cytotechnology opened to train students in cytology techniques. The first class had two students. Current classes have 12 students.

1958 -- Dr. Alfred S. Evans becomes WSLH director.

1960 -- WSLH establishes the first public health cytogenetics laboratory in the nation.

1962 -- WSLH publishes the first public health laboratory newsletter in the nation.

1963 -- State Lab researcher identifies the causative agent of LaCrosse (Wisconsin) encephalitis.

1966 -- Dr. Stanley L. Inhorn becomes WSLH director.

1966 -- Proficiency Testing program founded.

1974 -- State legislature establishes WSLH Board.

1975 -- Henry Mall addition completed and building is re-dedicated to Dr. Stovall.

1978 -- Newborn Screening laboratory established. In 1978 it tested for only four disorders. In 2003 it tests for 26.

1980 -- Dr. Ronald H. Laessig becomes WSLH director.

1980 -- State Lab assists DPH epidemiologists in linking Toxic Shock Syndrome to tampon usage.

1993 -- State Lab tests thousands of samples for Cryptosporidium from the world's largest single point outbreak in Milwaukee.

1999 -- Environmental Health Division moves into a new facility on Madison's East Side.

2001 -- WSLH tests hundreds of specimens throughout the state for anthrax contamination (all test negative).

2003 -- WSLH receives federal funds to enhance capacity related to homeland security.

The WSLH is fittingly named for Hygeia, the Greek Goddess of Health. Join us in wishing the WSLH much continued success and prosperity in the years ahead. Keep up the good work, Hygeia, You go, girl!

## **2. Four Important State Public Health Plan Web Pages**

### ***Healthiest Wisconsin 2010: A Partnership Plan to Improve the Health of the Public October 2003***

A. [www.dhfs.state.wi.us/Health/StateHealthPlan/](http://www.dhfs.state.wi.us/Health/StateHealthPlan/)

*Contains an electronic copy of Wisconsin's state public health plan*  
Healthiest Wisconsin 2010: A Partnership Plan to Improve the Health of the Public

B. [www.dhfs.state.wi.us/Health/StateHealthPlan/](http://www.dhfs.state.wi.us/Health/StateHealthPlan/)

*Contains an electronic copy of the July 2003 special supplemental report to the state public health plan: Engaging and Sustaining Selected Community Stakeholders in the Transformation of Wisconsin's Public Health System*

C. [www.dhfs.state.wi.us/Health/StateHealthPlan/ImplementationPlan/](http://www.dhfs.state.wi.us/Health/StateHealthPlan/ImplementationPlan/)

Contains the electronic copies of the Implementation Plans for the 16 each health and system (infrastructure) priorities identified in *Healthiest Wisconsin 2010*. These documents are the implementation plans and provide rich detail developed by Wisconsin's public health system partners. Each of the 16 priorities includes long term outcome objectives with accompanying logic models and templates for each objective. There are approximately 60 objectives for the 16 priorities.

D. [www.dhfs.state.wi.us/Health/TurningPoint/](http://www.dhfs.state.wi.us/Health/TurningPoint/)

Contains information about the Wisconsin Turning Point Initiative, Wisconsin's policy process to transform Wisconsin's public health system for the 21<sup>st</sup> Century. This web page will be updated in the near future.

Please help transform Wisconsin's public health system by disseminating this information in your networks and taking collective action to transform Wisconsin's public health system for the 21<sup>st</sup> Century and becoming actively involved as a public health system partner.

**Contact:**

**Office of Public Health Improvement, Wisconsin Division of Public Health  
Wisconsin Division of Public Health, DHFS  
Margaret Schmelzer and Shirley Bostock  
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### **3. Hepatitis C Guidelines for Local Health Departments**

The final version of the draft Hepatitis C Guidelines for Local Health Departments (LHDs) that were distributed at the 2001 Spring Seminars has been approved by the Department of Health and Family Services (DHFS). These Guidelines were developed by program experts and revised in response to comments from external reviewers. They provide specific direction on several aspects of LHD follow-up of persons with hepatitis C virus infection including health education and risk reduction; hepatitis A and hepatitis B vaccine; referral for medical evaluation and support and screening, testing and surveillance for HCV infection. Hard copies of the Guidelines will be mailed to all Health Officers during the week of October 20, 2003. The Guidelines have also been posted on the Health Alert Network (HAN) under Topics-Communicable-Manuals and on the DHFS website at [www.dhfs.state.wi.us/dph\\_bcd/hepatitis](http://www.dhfs.state.wi.us/dph_bcd/hepatitis) under Provider Resources.

### **4. Wisconsin Local Health Department Follow-Up of Persons with Hepatitis C Virus Infection (Abstract)**

(The full text of this article will appear in the Fall 2003 issue of the *AIDS/HIV Update*)

**Background.** More than 4,000 probable and confirmed cases of hepatitis C virus (HCV) infection were reported in Wisconsin in 2002, making this one of the most frequently reported communicable diseases in the state. Despite the morbidity burden and the chronic nature of this disease, funds for hepatitis C initiatives in the public sector at the state and local levels have been extremely limited. However, the existing public health infrastructure in Wisconsin has supported provision of some HCV services (e.g.,

health education, hepatitis A and B vaccination, medical referral and hepatitis C testing) by local health departments (LHDs).

**Methods.** To describe the public health response to HCV infection at the local level in Wisconsin, a survey of LHD Nursing Directors or Health Officers was conducted in Spring 2003 via the Wisconsin Health Alert Network (HAN). Respondents were asked whether the LHD followed-up clients with HCV infection; whether follow up was extended to probable as well as confirmed cases; how follow-up was provided; and which services were offered. Respondents were also asked their opinions on how serious HCV was locally and the degree to which LHD follow-up could impact transmission and development of liver disease; and to rank resources that could potentially improve the LHD's HCV follow-up activities.

**Results.** Of the 96 Wisconsin LHDs that were given access to the survey, 74 (77%) responded. Of these, 73 (99%) follow-up persons with HCV infection and 60 (82%) of these follow-up both probable and confirmed cases. Of the 73 LHDs that provide follow-up, 73 (100%) make phone calls, 70 (96%) send letters and 41 (56%) conduct home visits. Additionally, 73 (100%) provide health education and risk reduction information, 62 (85%) provide medical referral; 51 (70%) provide hepatitis A and hepatitis B immunizations; and 16 (22%) provide HCV testing. Fifty (68%) LHDs have at least one staff member who draws blood and an additional 10 (14%) have arrangements whereby another agency draws clients' blood.

Forty-nine LHDs (66%) agreed or strongly agreed that HCV infection was a serious public health problem and 72 (97%) agreed or strongly agreed that LHD follow-up of persons with HCV infections could help reduce HCV transmission and development of liver disease. LHDs that viewed HCV infection as a serious public health problem for their communities were more likely to follow-up all persons with HCV infection, offer testing for HCV infection and develop procedures for follow-up. Of the HCV follow-up resource options, LHDs selected funds to reimburse their services as most helpful, followed by patient educational materials, training on counseling persons with HCV infection; information on interpreting hepatitis serologic test results and training on venipuncture.

**Summary.** Most LHDs in Wisconsin are providing follow-up to persons with HCV infection and are to be commended for this. All LHDs contact clients by phone and offer health education and risk reduction information. Most LHDs also provide medical referral and hepatitis A and hepatitis B vaccine as needed. However, only a few LHDs provide testing for HCV infection, although this testing can be done on a fee-exempt basis through the Wisconsin State Laboratory of Hygiene (WSLH). Lack of staff with venipuncture skills does not explain why only a few LHDs provide HCV testing. LHDs that employ appropriately trained staff are urged to consider offering HCV testing to persons with risk factor(s) for HCV infection who are un- or under-insured. The Hepatitis C Guidelines for Local Health Departments (Section 4. Screening and Testing for HCV Infection) provides detailed information on who should be tested for HCV infection, client selection criteria for fee-exempt testing, and specimen collection and submission to the WSLH. Hard copies of the Guidelines will be mailed to all Health Officers during the week of October 20, 2003. The Guidelines have also been posted on the Health Alert Network (HAN) under Topics-Communicable-Manuals and on the DHFS website at [www.dhfs.state.wi.us/dph\\_bcd/hepatitis](http://www.dhfs.state.wi.us/dph_bcd/hepatitis) under Provider Resources.

## 5. Interpreting Hepatitis C Virus Test Results

*Angela Russell, MS, Epidemiologist, Hepatitis C Program, Wisconsin Division of Public Health*

The hepatitis C virus (HCV) was first recognized in 1989. Because serological tests and interpretation of tests used to identify HCV continuously change, interpreting hepatitis C test results can be very

challenging and confusing. However, correct interpretation of test results is essential for accurate reporting, follow-up, and treatment of persons with HCV in Wisconsin. This article provides a brief summary on interpreting the two types of serological tests used in diagnosing HCV infection: antibody tests and HCV ribonucleic acid (RNA) tests.

### **Antibody tests**

HCV antibody test results are used to determine the presence of HCV antibody (anti-HCV). Anti-HCV tests can indicate past or present infection, however they cannot differentiate between acute, chronic, or resolved HCV infection (CDC, 1998). Currently, there are several tests used to determine anti-HCV including the enzyme immunoassay and recombinant immunoblot assay.

*Enzyme immunoassay (EIA)* - This test is also referred to as an anti-HCV screening test. The EIA test is used to qualitatively determine the presence or absence of anti-HCV in human sera or plasma. The positive predictive value (ppv), the percent of individuals tested positive for HCV who actually have the disease, of the EIA test for detecting anti-HCV varies with the prevalence of HCV in a specific population. For example, in a population with a low prevalence of HCV, the ppv is low for determining anti-HCV via EIA (CDC, 1998). Because of the variability of the EIA's test ppv, all positive EIA tests for anti-HCV must be confirmed by one of the following methods: determination of the signal-to-cutoff ratio, a RIBA test, or a qualitative PCR.

The signal to cutoff (s/co) ratio is a comparison of the optical density of the client's positive anti-HCV (usually via EIA) result to the optical density of the laboratory's positive anti-HCV control. The purpose of the s/co ratio is to predict true (past or present) anti-HCV infection. Signal-to-cutoff ratios are reported out qualitatively as either "high" or "low." For a more detailed discussion of s/co ratios and reporting of HCV test results, see the Summer 2003 issue of the *Wisconsin AIDS/HIV Update* (page 30) for the article titled "Reporting HCV antibody test results with qualitative reporting of signal-to-cutoff ratios."

*Recombinant immunoblot assay (RIBA)* - Similar to the EIA, the RIBA is used to determine anti-HCV in human sera or plasma. The RIBA is considered a supplemental test to the EIA. Supplemental testing with a RIBA of a specimen with a positive EIA result prevents reporting of false-positive results, particularly in settings where asymptomatic persons are being tested (CDC, 1998). The presence of anti-HCV as detected by the EIA and confirmed by a RIBA does not distinguish between past or present infection; a PCR test must be done to determine if a person currently has circulating virus for hepatitis C. Historically, the RIBA was most useful in testing involving the first generation of the EIA and when the probability of false-positives was high. Currently, however, a high s/co ratio report can "confirm" an EIA test result without performing a RIBA.

### **HCV RNA tests**

HCV RNA tests are used to detect circulating virus of hepatitis C. HCV RNA can be detected in serum between 1-2 weeks after HCV exposure. A positive HCV RNA test indicates active infection, however, a single negative HCV RNA test does not exclude the possibility of HCV infection since some HCV-infected persons might be only intermittently HCV RNA positive, particularly those with acute hepatitis C or with end-stage liver disease caused by HCV. There are several different tests used to identify HCV RNA in sera including the polymerase chain reaction and the branched chain DNA (bDNA) tests.

*Polymerase chain reaction (PCR)* - The PCR test is used to detect the presence of HCV RNA in serum samples. There are two types of PCR tests: qualitative and quantitative. The qualitative PCR tests indicate whether or not a person has circulating HCV RNA whereas the quantitative tests are used to determine the concentration of HCV RNA. Qualitative tests are typically used in the diagnosis of HCV (Podzorski, 2002).

Quantitative tests are most often used to monitor patients on HCV treatment. These tests are useful for determining a client's likelihood of response to treatment. Quantitative tests, however, should not be used to diagnose HCV or to determine treatment endpoint. Results of quantitative tests are reported in international units. The HCV concentration cutoff varies with specific quantitative test methods. Thus, test results below or above the detectable cutoff limits cannot be used to exclude HCV diagnosis. It is also important to note that HCV concentration does not correlate with severity of HCV infection (Podzorski, 2002).

*Branched chain DNA (bDNA)* – Similar to the quantitative PCR, the bDNA test is used to determine the concentration of HCV RNA. The bDNA is another type of quantitative HCV RNA test.

### ***Interpretation of Test Results***

(Adapted from Centers for Disease Control and Prevention. Guidelines for laboratory testing and result reporting of antibody to hepatitis C virus. MMWR 2003;52(No. RR-3):[inclusive page numbers].)

Anti-HCV screening test results	RIBA	HCV RNA	Interpretation	Comments
Negative	N/A	N/A	Negative	Not infected with HCV
Negative	Negative	Positive	Confirmed case	Active HCV infection; test subject is likely immunocompromised.
Positive	Indeterminate	Not done	Unknown	HCV antibody infection status cannot be determined
Positive	Indeterminate	Negative	Negative	Not infected with HCV
Positive	Negative	Negative	Negative	Not infected with HCV
Positive	Negative	Not done	Negative	Not infected with HCV unless recent infection is suspected or other evidence exists to indicate HCV infection
Positive	Not done	Positive	Confirmed HCV case	Active HCV infection
Positive	Not done	Negative	Possible HCV case	A single negative HCV RNA result does not rule out active infection
Positive	Positive	Not done	Confirmed HCV case	Past or present infection
Positive	Positive	Negative	Confirmed HCV case	Past or present infection; a single negative HCV RNA result does not rule out active infection
Positive	Positive	Positive	Confirmed HCV case	Active HCV infection
Positive with high s/co*	Not done	Not done	Confirmed HCV case	Past or present infection
Positive with low s/co	Not done	Not done	Possible HCV case	Supplemental test necessary

\* The signal to cutoff ratio is based upon the EIA test result.

Interpreting HCV test results will remain a challenge for practitioners and public health professionals as HCV assays continue to evolve. It is important that health care professionals remain current with these

changes in the clinical and public health management of HCV infection. The correct use and interpretation of HCV assays is essential to maintaining the integrity of the HCV surveillance and the prevention and control of HCV infection in Wisconsin.

For additional information on HCV test interpretation and reporting practices in Wisconsin, contact Angela Russell, HCV Surveillance Coordinator, at 608-266-9710 or email [russear@dhfs.state.wi.us](mailto:russear@dhfs.state.wi.us)

**References:**

Centers for Disease Control and Prevention. Recommendations for prevention and control of hepatitis C virus infection and HCV-related chronic disease. *MMWR* 1998;47(No. RR-19):[inclusive page numbers].

Centers for Disease Control and Prevention. Prevention and Control of Infections with Hepatitis Viruses in Correctional Settings. *MMWR* 2003;52 (No. RR-1): [inclusive page numbers].

Centers for Disease Control and Prevention. Guidelines for laboratory testing and result reporting of antibody to hepatitis C virus. *MMWR* 2003;52 (No. RR-3):[inclusive page numbers].

Podzorski RP. Molecular testing in the diagnosis and management of hepatitis C virus infection. *Arch Pathol Lab Med.* 2002;126:285-290.

## **6. Hepatitis Conference Materials on Interpreting Hepatitis Test Results**

A review of the evaluations from attendees of the well-attended, well-received 9/5/03 Wisconsin Viral Hepatitis Conference indicated a continuing need for information on interpreting hepatitis serologic test results. Joanna Buffington, MD, a Medical Epidemiologist from the Centers for Disease Control and Prevention, presented information on this topic at the conference and has graciously agreed to share her slides she used. Her PowerPoint presentation has been posted on the Health Alert Network (HAN) under Topics-Communicable-Communicable Presentations.

### **Telephone Reporting of Unusual Disease Occurrences**

*Occurrences of diseases that are uncommon or atypical in Wisconsin, and outbreaks or clusters of disease which are identified, should be reported by phone as soon as possible, to (608) 258-0099. Reports may be made to this number on a 24/7 basis, but please do not use it for normal and routine disease reporting*

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